

NEW SPECIES OF VERNONIEAE (ASTERACEAE). V.

ADDITIONS TO *VERNONIA* FROM BRASIL.

Harold Robinson
Department of Botany
Smithsonian Institution, Washington, D.C., 20560.

A collection containing many undetermined specimens of *Vernonia* from Brasil was sent some years ago by the New York Botanical Garden, and more recently material from the State of Bahia has been made available through the aid of Scott Mori at Itabuna in Bahia and Charles Jeffrey at Kew. In the last year still more material of *Vernonia* from Bahia has been collected by R. M. King. Since names are needed for some chemical and cytological vouchers in the last collections, and since the U. S. National Herbarium has a rather complete representation of Brazilian species of *Vernonia*, a simultaneous effort has been made to determine the material of all the recent collections. As a result, the present paper adds 17 species to the more than 200 already described from Brasil. These new species cannot be matched with specimens, type photographs, or descriptions of previously known species. It should be noted that older undetermined material remains unworked, although searches have been made for earlier collections of the new species described here. The present effort has remained primarily one of identification, and careful monographic review is greatly needed.

Five species from Bahia have been described in a recent paper (Robinson, 1979), and two of these are now seen to need revision. *Vernonia mattos-silvae* H. Robins. is the same as *V. lanuginosa* Gardn. which I would resurrect from the synonymy of *V. scorpioides* var. *sororia* Baker. For reasons of pollen structure detailed below, combined with other characters given in the previous paper, it seems best to transfer *Vernonia nobilis* to the genus *Mattfeldanthus* H. Robins. & R.M. King. The combination is as follows:

MATTFELDANTHUS NOBILIS (H. Robins.) H. Robins., comb. nov. *Vernonia nobilis* H. Robins., Phytologia 44 (4): 291. 1979.

In discussions below of relationships of new species, a prime consideration has been the form of the pollen. Differences in pollen in the Vernonieae have been noted by many workers, including Stix (1960), Keeley and Jones (1977), and Jones (1979), and some consistency is evident within related groups. The terminology of Stix is given precedence here. Some comparisons are offered with other characters and with the mostly artifici-

al Sections and subseries of Baker (1873).

The most distinctive pollen type in the genus is the *Lychnophora*-Type of Stix (Type A of Keeley & Jones, 1977, and Jones, 1979). This has irregular and comparatively low, thickened or crested areas on the surface of the pollen. The diameter is ca. 40 μm . The Type is found in *V. noveboracensis* (L.) Michx., the type species of the genus from eastern North America. In Tropical America the Type occurs in various species of the section *Critoniopsis*, and in the parts of Baker's Lepidaploae *Scorpioidae* which contains *V. scorpioides* Pers., *V. brasiliiana* (L.) Druce, *V. patens* H.B.K. and *V. polyanthes* (Spreng.) Less. The Type has already been noted as occurring in *V. harleyi* H.Robins. and *V. lanuginosa* Gardn. (Robinson, 1979), and it occurs in *V. piresii* n.sp., all of which are close relatives of *V. scorpioides*. The Type also occurs in *V. angulata* n.sp., which has a thyrsoid panicle, and which seems to fall in the Lepidaploae *Paniculatae* of Baker. The two new species with the pollen type also share a type of anther appendage showing minute spicules but no glands on the outer surface, but such spicules are not present in some of the related species.

The majority of Brasilian species have pollen grains of larger size with high crests forming distinct lophorate patterns. Different lophorate patterns were distinguished first by Stix (1960), and these, plus one other type distinguished here, seem to be of some taxonomic use.

The most common lophorate form of pollen is the *V. argyrophylla*-Type of Stix (Type B of Jones, 1979), having the three colpar areolae meeting at the poles and having three rows of areolae across the intercolpar region. Species with this type include, *V. morii* H.Robins., from the previous paper, as well as *V. caiapoensis*, *V. cristalinae*, *V. fonsecae*, *V. greearii*, *V. pseudopiptocarpha*, *V. soderstromii*, *V. souzae* and *V. subcarduoides* described below. These species have characters of the various series *Axilliflorae*, *Macrocephalae* and *Oligocephalae* of the Section Lepidaploae of Baker (1873).

A minor variant of the *V. argyrophylla*-Type has partial or complete additional partitions across the colpar region above and below the pores. Species involved include *V. regis* n.sp. having the characters of Section *Stenocephalum*, and the singularly distinctive scapose *V. santosii* n.sp., with its few large heads having the peripheral flowers maturing precociously as a group before the central corallas emerge from the pappus.

The previous subtype approaches the *V. arenaria*-Type of Stix (Type D of Jones, 1979), which has cross-walls above and below the pores, but which has only two series of intercolpar areolae. The Type occurs in *V. pinheiroi* and *V. tombadorensis*, described below, both of which seem to belong in a natural group with *V. arenaria* Mart. marked by variously T-shaped hairs on the vegetative parts of the plants. The pollen Type also is seen in *V. echinocephala* n.sp. which resembles *V. holosericea*.

and its relatives in the Lepidaploae Paniculatae of Baker (1873) in its great number of spreading spine-like involucral bracts.

Another pollen variation is termed here the *V. geminata*-Type. The three colpar areolae are continuous and meet at the poles as in the *V. argyrophylla*-Type, but there are only two series of intercolpar areolae. The Type is found in *V. persericea* H. Robins. from the previous paper, as well as *V. alvimii* and *V. hagei*, described below, all from Bahia. All are related to *V. geminata* Less., described from near Rio de Janeiro. The group is notable for including obviously related species, some of which have large inflorescence bracts and would fall in the Axilliflorae series of Baker, while *V. coulonii* Sch. Bip. ex Baker and *V. geminata* have minute inflorescence bracts and have been placed in the Scorpio-oides series by Baker. The *V. geminata*-Type pollen also occurs in the genus *Mattfeldanthus*, and its occurrence in *Vernonia nobilis* is one of the reasons that species is transferred here. The genus *Mattfeldanthus* can be characterized by the *V. geminata*-Type pollen, the pluri-axillary branching of the inflorescence, the unequal lobing of the corollas, and the more completely lignified tips of the corolla lobes.

The distinctive *V. cognata*-Type pollen of *Stix* (Type C of Jones, 1979) has a separate polar areole, lacks cross-walls above and below the pores in the colpar region, and has only two rows of intercolpar areolae. *Stix* reported the Type from four species, but none of these or any of the natural group related to *V. cognata* Less. have been examined in this study. The Type does not occur in any of the new species, but it has been seen in *V. lilacina* Mart. of Bahia and Minas Gerais, a species that otherwise resembles the *V. geminata* group.

The 17 new species are as follows.

VERNONIA ALVIMII H. Robinson, sp. nov.

Plantae suffruticosae ca. 1 m altae mediocriter ramosae. Caules teretes striati evanescentiter laxe strigosi vel sub-sericei. Folia alterna, petiolis ca. 2-4 mm longis; laminae ellipticae vel oblongo-ellipticae plerumque 3-6 cm longae et 1.2-2.2 mm latae base anguste rotundatae margine anguste recurvatae obscure remote subserrulatae apice argute acutae vel vix acuminate supra strigosae vel subsericeae subtus dense sericeae et sparse glandulo-punctatae, nervis secundariis utrinque ca. 5-6 ascendentibus. Inflorescentiae plerumque axillares multo ramosae, ramis serialiter cymosis in nodis vix vel non deflectis laxe strigosis vel subsericeis, bracteis plerumque minutis vel nullis. Capitula in seriebus solitaria vel geminata sessilia ca. 8 mm alta et 4-6 mm lata; squamae involucri ca. 28-30 subimbricatae ca. 4-5-seriatae appressae lanceolatae vel oblongo-lanceolatae 1-5 mm longae et 0.4-1.2 mm latae apice acutae vix pungentes margine albo-scariosae ad medio viridi-vittatae extus laxe villosae. Flores 12-15 in capitulo. Corollae albae? in textura

tenues 4.5-5.0 mm longae, tubis ca. 2 mm longis extus plerumque glabris superne latioribus et sparse minute glanduliferis, faucibus ca. 0.5 mm longis, lobis linearibus ca. 2.8 mm longis et 0.4 mm latis extus plerumque glabris ad apicem dense glandulo-punctatis et paucे spiculiferis; thecae antherarum ca. 1.7 mm longae base in partibus breviter caudatae; appendices antherarum ovatae ca. 0.5 mm longae et 0.23 mm latae apice acutae extus multo glanduliferae; scapi stylorum in partibus hispidulis superioribus ca. 0.2 mm longi; rami stylorum extus sparse glanduliferi. Achaenia ca. 2 mm longa ubique patentiter setifera et multo prominentiter punctata, punctis superficialibus 1-3-cellulatis subglanduliformibus; setae pappi persistentes ca. 37 plerumque 4.0-4.5 mm longae apice non latiores margine et extus scabridulæ, squamae exteriores oblongo-lanceolatae vel linearis-lanceolatae 0.6-1.0 mm longae et 0.06-0.15 mm latae apice irregulares extus sparse scabridulæ. Grana pollinis in diametro ca. 40 μm valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. geminata*-Type).

TYPE: BRASIL: Bahia: Município de Santa Cruz de Cabrália a 5 km a W de Santa Cruz de Cabrália. Restinga. Elev. ca. 50 meters. Common, one meter tall, flowers white. July 6, 1979. R.M.King, Scott Mori, A.M.de Carvalho & A.Euponino 7991 (Holotype, RB; isotypes, CEPEC, US).

The species is named for Dr. Paulo Alvim, Director of Research, at the Centro de Pesquisas do Cacau, Itabuna, Bahia.

Vernonia alvimii is related to *V. geminata*, with which it shares the same pollen type, the same kind of 1-3-celled punctations on the achene surface, glands on the anther appendages and style branches, and the minute bracts subtending the heads. The new species differs most obviously by the lack of long sharply pointed reflexed tips on the involucral bracts, and the heads have significantly fewer bracts and flowers, ca. 40 and 12-15, versus ca. 50 bracts and ca. 25 flowers in *V. geminata*. The leaves are also less densely glandular-punctate below and have appressed rather than spreading pubescence. The recently described *V. persericea* H.Robins. is also evidently closely related, but differs by the densely sericeous pubescence, the lack of gemmiform bulging punctations formed of idioblasts on the achene surface, and the lack of glands on almost all parts. Authentic material of the related *V. coulonii* has not been seen, but the description and a type-photograph indicate the leaves are broader with cordate to subcordate bases and subglabrous surfaces, and that there are only 15-20 flowers in the heads.

The pollen of the new species seems to be of the *V. geminata*-Type, but the type specimen was over-aged and infested with gall-insects, and only one grain has been seen with any clarity. The galls are of a type also seen commonly in *V. geminata*.

The bulging gemmiform punctations on the surface of the achenes consisting of 1-3 rather thick-walled cells, seem to be idioblasts of some sort, each cell containing a large central

body that seems to be a crystal.

The habitat of the new species is in the restinga, while the label data indicates the related *V. geminata* is a plant of forest edges. The latter species is not presently known to occur north of the southern part of Minas Gerais and Espírito Santo.

VERNONIA ANGULATA H. Robinson, sp. nov.

Plantae suffruticosae vel fruticosae erectae ca. 1 m altæ non vel paucæ ramosæ. Caules fulvescentes distincte 5-7-angulati puberuli vel minute pilosi. Folia alterna sessilia vel subsessilia, petiolis ad 2 mm longis; laminae oblongæ vel oblongo-ovatae plerumque 3.0-5.5 cm longæ vel 2.0-3.5 mm latae base rotundatae vel breviter obtusæ margine distincte multo serrulatae apice breviter obtusæ supra puberulae subtus dense glandulo-punctatae et in nervis et nervulis puberulæ. Inflorescentiae terminales thyrsideo-paniculatae in ramis subcymosis, ramis distincte angulatis dense puberulis, ramis ultimis in capitulis primariis subnullis in capitulis ultimis ad 16 mm longis, bracteis primariis foliiformibus ad 3 cm longis et 2 cm latis, bracteis ramorum minutis. Capitula late campanulata ad 9 mm alta et 14 mm lata; squamae involucri fulvescentes ca. 45-50 subimbricatae ca. 5-seriatae, exteriore valde recurvatae lanceolatae 4-6 mm longæ 1.3-1.5 mm latae apice breviter pungentes margine dense longe fimbriatae, interiores erectæ 6-7 mm longæ apice acutæ margine minute fimbriatae, omnes extus sparse puberulae et superne dense glandulo-punctatae; receptacula leniter convexa hispidula. Flores ca. 50 in capitulo. Corollæ albae 6.5-7.0 mm longæ extus glabrae, tubis anguste infundibularibus ca. 3 mm longis, faucibus infundibularibus ca. 1.5 mm longis, lobis linear-lanceolatis ca. 3 mm longis et ca. 0.6 mm latis; thecae antherarum ca. 2.5 mm longæ; appendices antherarum anguste ovatae ca. 0.7 mm longæ et 0.23 mm latae apice acutæ extus inferne paucæ minute spiculiferae; nodi stylorum late disciformes margine subtiliter crenulati; scapi stylorum in partibus hispidulis superioribus subnulli. Achaenia ca. 1.5 mm longa in costis dense breviter hispidulo-setifera inter costas dense pustulifera, pustulis 1-3-cellularis; setae pappi albae ca. 35 plerumque ca. 5.5 mm longæ superne sensim latiores margine et extus dense scabridulæ, series exteriore setiformes ca. 0.5 mm longæ dense scabridulæ. Grana pollinis in diametro ca. 40 μ m irregulariter areolata et spinulosa (*Lychnophora*-Type).

TYPE: BRASIL: Goiás: Serra do Caiapó, ca. 40 km S of Caiapônia, road to Jataí, wet slope. Elev. 950 m. Subshrub ca. 1 m tall. 26 June 1966. H.S. Irwin, R. Souza, J.W. Gear, R. Reis dos Santos 17793 (Holotype, US). PARATYPES: BRASIL: Goiás: Serra do Caiapó, ca. 25 km (straight line) SW of Caiapônia; elev. 800 m; gallery forest, adjacent brejo, and nearly cerrado and campo limpo. Herb 1.5 m tall; heads white; brejo. 1 May 1973. W.R. Anderson 9593 (US); Município Jataí, loc. Queixada. Arbusto da várzea, (fl.) brancas e lilajes. 8-VII-1949. A. Macedo 1904

(US); Municipio Jataí, loc. Balsano. Arbusto da vargeur, (f1.)
brancas. 18-VII-1951. A.Macedo 3376 (US).

Material of the new species has been labelled previously as *V. scabra* Pers., which equals *V. brasiliensis*, and the two species are undoubtedly related. The relationship does not seem to be immediate, however, and even the leaves, which are similarly obtusely pointed, have a basically different shape, being mostly obovate in *V. brasiliensis*. The form of the inflorescence is denser in *V. angulata*, and it is more closely matched by that of *V. griseola* Baker ex Warming. The new species is distinguishable from all of the most likely relatives by the narrow recurved tips on the involucral bracts. The stems of the new species also tend to be more sharply angled.

VERNONIA CAIPOENSIS H. Robinson, sp. nov.

Plantae herbaceae; rhizomata horizontalia brevia. Caules primarii erecti interdum aggregati in partibus inferioribus non ramosi ad 40 cm alti flavescentes subpentagonales et paue striati sparse puberuli. Folia alterna sessilia linearia plerumque 3-8 cm longa et 0.30-0.35 cm lata margine integra apice anguste acuta et minute apiculata supra et subtus glabra vel sparse minute puberula subtus sparse minute et indistincte glandulo-punctata, nervis secundariis brevibus tenuibus prominulis, nervis marginalibus valde distinctis. Inflorescentiae laxe cymosae pauci-capitatae, bracteis foliiformibus, pedunculis elongatis ad 8 cm longis superne leniter latioribus et densius puberulis. Capitula late campanulata ad 17 mm alta et 12-17 mm lata; squamae involucri subcoriaceae ca. 35-45 subimbricatae 4-5-seriatae erecto-patentes plerumque lanceolatae 1.5-12.0 mm longae et 0.8-1.8 mm latae apice pungentes margine anguste scariosae in partibus laxe longe fimbriatae extus puberulae vel sparse arachnoideo-pilosae superne fulvescentes vel purpureo-tinctae. Flores ca. 20 in capitulo. Corollae lavandulae 13-14 mm longae, tubis 7-8 mm longis infundibularibus extus glabris, faucibus ca. 1.5 mm longis, lobis linearibus 4.5-5.0 mm longis et 0.6 mm latis plerumque glabris fere ad apicem paue piliferis et minute glanduliferis; thecae antherarum ca. 4 mm longae; appendices antherarum ovato-lanceolatae ca. 0.7 mm longae et ca. 0.2 mm latae apice breviter acutae extus glabrae; basi stylorum non abrupte noduliferi; scapi stylorum in partibus superioribus hispidulis ca. 1.3 mm longi. Achaenia submatura ca. 2.5 mm longa inter costas perdense setifera; setae pappi ca. 40 plerumque 7.0-8.5 mm longae superne non latiores plerumque in marginis dense scabridulae; squamae exteriores anguste lineares ca. 1 mm longae extus sparse minute spiculiferae. Grana pollinis aliquantum oblata ca. 45 μ m alta et 55 μ m lata valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. argyrophylla*-Type).

TYPE: BRASIL: Goiás: Serra do Caiapó, $17^{\circ}12'S$, $51^{\circ}47'W$. 60 km S of Caiapónia on road to Jataí. Elev. 800-1000 m. Burned-over cerrado. Stems mostly solitary, to 40 cm tall. Heads

magenta. Oct. 29, 1964. H.S. Irwin & T.R. Soderstrom 7518 (Holotype, US).

Vernonia caiapoensis has narrow essentially glabrous leaves and sparsely branched inflorescences with long-pedunculate heads as seen in the related *V. grandiflora* Less. and *V. sessilifolia* Less. The new species differs from both by the generally smaller size, by the narrowly pointed involucral bracts, and by the weak spreading secondary veins of the leaf that end in a strong marginal vein. The related species have more prominent ascending secondary veins, and they lack a well-developed continuous marginal vein.

VERNONIA CRISTALINAE H. Robinson, sp. nov.

Plantae herbaceae perennes erectae ad 50 cm altae non ramosae. Caules leniter pentagonales dense sordide tomentosi. Folia alterna sessilia elliptica vel obovata vel leniter oblanceolata inferne ad 3.5-6.5 cm longa et 1.5 cm lata superne descrecentia base cuneata vel interdum leniter constricta margine integra vel superne pauce subcrenulata apice obtusa vel breviter acuta supra tenuiter sericea glabrescentia subtus dense sordide tomentosa, nervis secundariis utrinque 3-5 valde ascendentibus. Inflorescentiae terminales 1-2-capitatae, bracteis subinvolucralibus capitulis saepe proximis foliiformibus oblongis plerumque 9-15 mm longis et 4-5 mm latis. Capitula late campanulata; involucra 10-15 mm alta et 10-20 mm lata; squamae involucri purpureo-tinctae vel atro-purpureae 70-100 subimbricatae 4-6-seriatae subappressae exterieores apice leniter patentes lanceolatae 3-13 mm longae et 1-2 mm latae apice acutae praeter interiores breviter pungentes margine plerumque pallidiores induratae dense puberulo-fimbriatae extus plus minusve tomentosae ad medio distincte uni-costatae. Flores ca. 35-45 in capitulo. Corollae lavandulae 13-14 mm longae, tubis anguste infundibularibus ca. 7 mm longis ad medio persparse minute glanduliferis, faucibus 1.5-2.0 mm longis glabris, lobis linearibus 4.5-5.0 mm longis ca. 0.7 mm latis subapice dense minute spiculiferis margine pauce tenuiter piliferis; thecae antherarum ca. 3 mm longae; appendices antherarum anguste ovatae ca. 0.7 mm longae et 0.23 mm latae apice anguste rotundatae extus glabrae; basi stylorum non vel vix noduliferi, scapi stylorum in partibus superioribus sparse hispidulis 0.5-1.0 mm longi. Achaenia ca. 3 mm longa inter costas dense longe lanato-setifera; setae pappi 35-40 plerumque 6-7 mm longae superne distincte clavatae inferne plerumque in marginis scabridulæ apice margine et extus dense scabridulæ, scabridulæ distincte apiculatis; series exterieores setiformes vel anguste squamiformes ca. 1 mm longae extus sublaeves. Grana pollinis leniter oblate ca. 55 μ m alta et ca. 65 μ m lata valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. argyrophylla*-Type).

TYPE: BRASIL: Goiás: Serra dos Cristais, 17°S, 48°W. Campo, ca. 2 km N of Cristalina. Elev. 1250 m. Herb to ca. 25 cm tall.

Heads magenta. 2 March 1966. *H.S.Irwin, J.W.Grear, Jr., R.Souza & R.Reis dos Santos* 13309 (Holotype, UB; isotype, US). PARATYPES: BRASIL: Goiás: same data as Type. Herb ca. 8 cm tall. *Irwin et al.* 13304 (NY); Campo, ca. 10 km W of Cristalina. Elev. 1200 m. Erect herb ca. 15 cm tall. 5 March 1966. *Irwin et al.* 13534 (NY); Chapada dos Veadeiros, ca. 19 km N of Alto do Paraíso. Elev. ca. 1250 m. Campo. Cerrado on steep rocky slopes, surrounded by campo. Herb to ca. 50 cm tall. Heads magenta. 20 March 1971. *H.S.Irwin, R.M.Harley & G.L.Smith* 32817 (US).

The new species seems close to *V. irwinii* Barroso and *V. bardanoides* Less. which have similar erect narrowly pointed unicostate involucral bracts and corollas with throats exserted well beyond the tips of the pappus setae at anthesis. The new species differs by the characteristically limited number of heads in the inflorescence, the shorter tips on the involucral bracts which never exceed the pappus at anthesis, by the distinctly clavate tips of the pappus setae, and by the denser tomentum on the under-surfaces of the leaves. A variety *uniflora* Barroso of *V. irwinii* can apparently have a single head in the inflorescence, but the isotype of the variety at the USNH is a plant with a series of 5 heads. The new species also tends to differ by the generally smaller leaves with fewer secondary veins, and by the shorter less squamiform outer series of the pappus.

VERNONIA ECHINOCEPHALA H. Robinson, sp. nov.

Plantae suffruticosae vel fruticosae ad 2 m altae mediocriter ramosae. Caules nigrescentes teretes distincte costati breviter cinereo-sericei juvenales dense albe sublanati. Folia alterna sessilia; laminae lanceolatae plerumque 2.5-6.0 cm longae et 0.5-1.5 cm latae base leniter constrictae margine integrae anguste reflexae apice acutae et minute apiculatae supra dense sericeo-puberulae subtus perdense albo-sericeae, nervis secundariis paucis brevibus ascendentibus. Inflorescentiae diffusae, pedunculis elongatis ad 8 cm longis non ramosis dense albo-sublanatis. Capitula solitaria campanulata ad 18 mm alta et 14 mm lata; squamae involucri ca. 400-500 subimbricatae 7-9-seriatae patentes vel erecto-patentes lineares 3-12 mm longae et 0.5-1.0 mm latae superne rubro-tinctae apice longe pungentes extus albo-sericeae. Flores ca. 50 in capitulo. Corollae lavandulace 10-11 mm longae, tubis anguste infundibularibus ca. 7 mm longis extus glabris, faucibus ca. 0.7 mm longis glabris, lobis linearibus ca. 3.5 mm longis et 0.5-0.6 mm latis extus plerumque glabris subapice paucis spiculiferis et minute glanduliferis; thecae antherarum ca. 2.7 mm longae; appendices antherarum oblongo-ellipticae ca. 0.45 mm longae et 0.22 mm latae extus glabrae; scapi stylorum in partibus hispidulis superioribus ca. 0.5 mm longi, rami stylorum extus plerumque contorte vel inflexe hispiduli. Achaenia ca. 1.8 mm longa longe setifera; setae pappi persistentes ca. 30 ca. 7 mm longae apice leniter latiores margine dense scabridulae extus paucis minute scabridulae, squamae exteriores lineares ca. 2 mm

longae ad 0.1 mm latae extus sublaeves. Grana pollinis in diametro ca. 50 μ m valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation near *V. arenaria*-Type but with incomplete additional cross-walls in colpar area above and below pores.

TYPE: BRASIL: Goiás: ca. 20 km N of Alto do Paraíso. Elev. ca. 1250 m. Disturbed places, gallery margin. Gallery forest and adjacent wet campo (Brejo). Subshrub ca. 1.5 m tall. Heads lilac-magenta. 19 March 1971. *H.S.Irwin, R.M.Harley & G.L.Smith* 32220 (Holotype, UB; isotype NY). PARATYPE: BRASIL: Goiás: Chapada dos Veadeiros, 14°S, 47°W. ca. 20 km W of Veadeiros. Elev. 1000 m. Creek margin, among rocks. Shrub ca. 2 m tall. In bud. 9 Feb. 1966. *H.S.Irwin, J.W.Greas,Jr., R.Souza, R.Reis dos Santos* 12438 (US).

Vernonia echinocephala is probably related to *V. holosericea* Mart. ex DC. and *V. pungens* Gardn. which also show the extreme development of many rows of slender pointed outer involucral bracts. The new species seems to have the largest number of bracts of any of the group. The new species has the heads solitary on long peduncles, and has broader leaves with the undersurfaces covered with dense white pubescence.

VERNONIA FONSECAE H. Robinson, sp. nov.

Plantae suffruticosae erectae ad 1.5 m altae. Caules teretes striati glabri. Folia alterna sessilia vel subsessilia; laminae oblongae vel oblongo-ellipticae plerumque 4-9 cm longae et 2.5-5.5 cm latae base breviter cordatae subamplexicaules margine integrae apice rotundatae vel breviter obtusae et minute apiculatae supra et subtus glabrae subtus minute glandulo-punctatae, glandulis immersis nigrescentibus, nervis et nervulis utrinque in reticulis minutis subtiliter prominulis, nervis secundariis utrinque plerumque 8-14 valde patentibus et leniter arcuatis basilaribus aliquantum retroris. Inflorescentiae non ramosae rectae vel subrectae, internodis glabris, bracteis foliiformibus ad 6.5 cm longis et 4.0 cm latis glabris. Capitula remota vel remotiuscula uniseriata sessilia axillaria vel extra-axillaria; involucra late campanulata 12-15 mm alta et lata post anthesin non vel paue constricta; squamae involucri brunnescentes ca. 80 subimbricatae ca. 6-seriatae plerumque appressae late ovatae vel linearilanceolatae 3-14 mm longae et 2-4 mm latae apice breviter obtusae vel acutae margine dense breviter setuliferae margine et extus evanescentiter sparse flexuose piliferae, interiores apice rubro-tinctae. Flores ca. 45 in capitulo. Corollae lavandulae in textura tenues 15-20 mm longae extus plerumque glabrae, tubis cylindraceis 6-10 mm longis et 0.8 mm latis, faucibus anguste infundibularibus 3-4 mm longis, lobis linearilanceolatis ca. 5 mm longis et 0.6 mm latis apice minute glanduliferis et breviter carnose appendiculatis; thecae antherarum 5 mm longae; appendices antherarum ovatae ca. 1 mm longae et 0.28 mm latae apice breviter acutae margine leniter recurvatae extus glabrae; scapi stylorum

in partibus hispidulis superioribus ca. 3 mm longi. Achaenia ca. 3.5 mm longa dense longe setifera superne in punctis superficialibus 1-3-cellulatus subglanduliformibus dense ornata; setae pappi persistentes ca. 50 plerumque ca. 11 mm longae apice latiores margine perdense scabridulae extus sparsius scabridulae, squamae exteriores anguste lanceolatae 1.5-2.0 mm longae et ca. 0.2 mm latae apice anguste acutae extus laeves. Grana pollinis leniter oblata in diametro ca. 75-80 μm valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. argyrophylla*-Type).

TYPE: BRASIL: Goiás: Chapada dos Veadeiros, ca. 20 km south of Alto do Paraíso (formerly Veadeiros). Elev. 1000 m. Campo on steep slopes with occasional outcrops. Erect shrub ca. 1.25 m tall. Heads magenta. 20 March 1969. H.S. Irwin, R. Reis dos Santos, R. Souza & S.F. da Fonsêca 24698 (Holotype, US). PARATYPES: BRASIL: Goiás: Chapada dos Veadeiros, ca. 7 km south of Cavalcante. Elev. 1000 m. Valley. Cerrado on steep rocky slopes and sandy valley flats below. Erect subshrub to ca. 1.5 m tall. Heads magenta. 8 March 1969. Irwin et al. 24040 (US); Ca. 30 km north of Veadeiros. Elev. 1000 m. Outcrops. Gallery woods and campo with outcrops. Erect herb or subshrub to ca. 1.5 m tall. Heads magenta. 16 March 1969. Irwin et al. 24503 (US).

Vernonia fONSEcae is in the general relationship of *V. mori* H. Robins. and *V. ammophila* Gardn., having large heads in a seriatel cymose inflorescence bearing large foliose bracts. The new species is immediately distinguished by the large, erect, smooth, glabrous, sessile leaves having cordate bases that sometimes slightly clasp the stem.

VERNONIA GREARII H. Robinson, sp. nov.

Plantae suffruticosae; rhizomata horizontalia brevia. Caules primarii erecti interdum aggregati in partibus inferioribus non vel paucē ramosi ad 1 m alti brunnescentes teretes vel subpentagonales paucē striati superne evanescentiter tenuiter arachnoideo-tomentosi. Folia alterna sessilia linearia plerumque 5-12 cm longa et ad 2 mm lata margine integra valde recurvata apice anguste acuta supra sparse scabridula in nervis primariis pallida distincte prominentia subtus distincte pallide tomentosa, nervis secundariis perbrevibus indistinctis. Inflorescentiae laxe cymosae paucē capitatae, bracteis foliiformibus, pedunculis plerumque elongatis ad 28 mm longis tenuiter canescentiter tomentosis. Capitula campanulata 12-14 mm alta et ca. 7-8 mm lata; squamae involucri violaceae ca. 70 subimbricatae 5-6-seriatae appressae orbicularia vel oblongae 0.5-8.0 mm longae et 1.0-2.3 mm latae apice rotundatae vel breviter obtusae margine dense minute albo-fimbriatae extus sparse evanescentiter arachnoideo-tomentosae superne ad medio multo glandulo-punctatae. Flores ca. 25 in capitulo. Corollae lavandulæ ca. 10 mm longae, tubis anguste infundibularibus ca. 5 mm longis extus glabris, faucibus ca. 1.7 mm longis glabris, lobis linear-lanceolatis ca. 3 mm

longis et 0.5-0.6 mm latis plerumque glabris apice pauce piliferis et minute glanduliferis; thecae antherarum ca. 3.3 mm longae; appendices antherarum ovato-lanceolatae ca. 0.5 mm longae et ca. 0.2 mm latae extus glabrae, cellulis marginalibus lateralibus subdistantibus; basi stylorum vix noduliferis; scapi stylorum in partibus hispidulis superioribus ca. 1 mm longi. Achaenia ca. 3.5 mm longa intra costas subdense sericeo-setifera; setae pappi sordidae ca. 40 plerumque 5.5-6.0 mm longae superne distincte latiores plerumque in marginis scabridulae ad apicem margine et extus dense scabridulae; squamae exteriores anguste lanceolatae vel lineares 1-2 mm longae extus minute spiculiferae. Grana pollinis leniter oblata ca. 47 μ alta et 55 μ lata valde lophorata, crista altis minute multo spinuliferis, spinis majoribus nullis (*V. argyrophylla*-Type).

TYPE: BRASIL: Goiás: Chapada dos Veadeiros, ca. 10 km N of Alto do Paraíso, elev. ca. 1250 m. Cerrado. Cerrado on outcrops with adjacent wet campo (brejo). Subshrub ca. 1 m tall. Heads lavender-magenta. 24 March 1971. H.S. Irwin, R.M. Harley & G.L. Smith 33090 (Holotype, UB; isotype, US). PARATYPES: BRASIL: Goiás: Chapada dos Veadeiros, ca. 20 km W of Veadeiros. Elev. 1000 m. Rocky slopes and wet campo. Slender herb ca. 1 m tall. In bud. 11 Feb. 1966. H.S. Irwin, J.W. Grear, Jr., R. Souza & R. Reis dos Santos 12565 (US); Ca. 10 km W of Veadeiros. Elev. 1000 m. Outcrops and sandy campo. Slender herb ca. 1 m tall. In bud. 15 Feb. 1966. H.S. Irwin, J.W. Grear, Jr., R. Souza & R. Reis dos Santos 12863 (NY); Ca. 20 km N of Alto do Paraíso, elev. ca. 1250 m. Gallery margin. Gallery forest and adjacent wet campo (brejo). Subshrub to ca. 1 m tall. Heads lilac-magenta. 19 March 1971. H.S. Irwin, R.M. Harley & G.L. Smith 32161 (US).

Vernonia grearii is closely related to *V. compactiflora* Mart., described from Mato Grosso, but the latter is a generally more robust plant with longer peduncles, larger heads containing 40-50 flowers, and more persistent pubescence on the stems. All leaves that have been seen of the new species are essentially filiform, with the pubescence of the undersurface only narrowly visible between the midrib and the strongly revolute margins.

VERNONIA HAGEI H. Robinson, sp. nov.

Plantae herbaceae ad 1 m altae. Caules virides vel brunnescentes teretes pauce costati evanescentiter sparse pilosi vel subglabri. Folia alterna, petiolis 2-5 mm longis dense pilosis; laminae lanceolatae vel oblongo-lanceolatae plerumque 4.5-13.0 cm longae et 1.5-2.5 cm latae base rotundatae vel subtiliter subcordatae integrae vel remote obscure subserrulatae anguste revolutae apice acutae et minute mucronulatae supra lucidae sparsae evanescentiter strigulosae subtus sparse sericeo-strigosae et multo glandulo-punctatae, nervis secundariis ascendenter arcuatis. Inflorescentiae terminales multo ramosae, ramis serialiter cymosis in nodis vix vel non deflectis distincte costatis et breviter pilosis, bracteis foliiformibus ovatis vel

anguste ovatis plerumque 0.4-3.5 cm longis et 0.3-1.6 mm latis. Capitula in seriebus solitaria vel raro geminata sessilia axillaria vel interdum alternantiter extra-axillaria campanulata 12-13 mm alta et 8-13 mm lata; squamae involucri virides ca. 50-60 ca. 4-5-seriatae exteriores patentes omnino lanceolatae vel linearilanceolatae 3-10 mm longae et ca. 1.0-1.5 mm latae apice longe pungentes margine inferne pallidiores et anguste scariosae superne sparse piloso-fimbriatae extus in squamis exterioribus superne sparse pilosis in squamis interioribus superne dense minute scabridulis. Flores ca. 25-30 in capitulo. Corollae albae in textura tenues ca. 7.5 mm longae, tubis anguste infundibularibus ca. 3.5 mm longis extus glabris vel subglabris, faucibus ca. 1 mm longis glabris, lobis oblongo-lanceolatis ca. 3.0 mm longis et 0.6 mm latis superne reflexis extus plerumque glabris ad apicem dense spiculiferis et breviter setiferis, setis multi-cellularibus biseriatis non glandulosis; thecae antherarum ca. 3 mm longae; appendices antherarum oblongo-ovatae ca. 0.5 mm longae et 0.28 mm latae apice rotundatae extus glabrae; scapi stylorum in partibus superioribus non hispiduli; rami stylorum ca. 3 mm longi extus hispiduli. Achaenia ca. 1.5 mm longa dense setifera; carpopodia in superficie superiore setifera; setae pappi subpersistentes ca. 60 plerumque 5-6 mm longae apice leniter latiores margine et extus dense scabridulae; squamae exteriores linearilanceolatae ca. 1 mm longae et ad 0.13 mm latae apice anguste acutae extus laeves. Grana pollinis in diametro ca. 50 μm valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (*V. geminata*-Type).

TYPE: BRASIL: Bahia: Município de Rio de Contas, entre Rio de Contas e Mato Grosso a 9 km ao N de Rio de Contas. Elev. ca. 1000 meters. Herb to ca. one meter tall, flowers white. July 20, 1979. R.M.King, S.Mori, T.S.dos Santos & J.L.Hage 8059 (Holotype, RB; isotypes, CEPEC, US).

Vernonia hagei is a member of the *V. geminata* group, and is like *V. geminata* and *V. alvimii* in the presence of glands on the undersurfaces of the leaves and lack of large foliose bracts in the inflorescence. The new species differs from both relatives by the longer lanceolate leaves and by the inflorescence with larger more remote heads. Further differences include the lack of recurved lower involucral bracts of the type seen in *V. geminata*, and the presence of a larger number of bracts and flowers in the heads than in *V. alvimii*. The new species rather resembles the widely distributed *V. salzmannii* DC., but the latter is a more pubescent species with shorter involucres and *V. cognata*-Type pollen, being more closely related to *V. lilacina* Mart.

The carpodium is basically an abscission zone, but in at least the *V. geminata* group of *Vernonia* the upper parts of the differentiated cap seem to represent epidermal tissue. A number of members of the group bear setae or even glands on this upper carpodial surface. This is seen best in *V. hagei* of the

brasiliensis species examined. Pubescence has not been noticed in any other tribe below the upper edge of the carpopodium.

VERNONIA PIRESII H. Robinson, sp. nov.

Plantae fruticosae 2-3 m altae mediocriter ramosae. Caules teretes striati dense sordide tomentosi. Folia alterna, petiolis brevibus 2-4 mm longis; laminae herbaceae obovatae vel leniter obpanduriformes plerumque 5-9 cm longae et 2.8-4.8 cm latae base abrupte anguste rotundatae margine superne multo subserrulatae apice late rotundatae supra in sicco atro-virides dense minute pilosulae in nervis primariis palide subtomentosae subtus laxe sordide vel fulve tomentosae, nervis secundariis utrinque ca. 10 ca. 35°-45° ascendentibus. Inflorescentiae terminales multo ramosae, ramis scorpioideo-cymosis dense breviter sordide tomentosis, bracteis nullis vel subnullis. Capitula in seriebus duibus alterne secunde disposita subsessilia late campanulata ca. 8 mm alta et 6-7 mm lata; squamae involucri ca. 45 fulvescentes subcoriaceae subimbricatae 4-5-seriatae breviter ovatae vel anguste oblongae ca. 1.0-4.5 mm longae et 0.8-1.3 mm latae apice breviter acutae et in carinis brevibus minute apiculatae margine anguste subscariosae superne dense minute fimbriatae extus plerumque glabrescentibus superne in maculis brunnescentibus glandulo-punctatae. Flores ca. 20 in capitulo. Corollae ca. 6 mm longae, tubis anguste infundibularibus ca. 2 mm longis extus glabris, faucibus ca. 1.5 mm longis glabris, lobis oblongo-lanceolatis ca. 2 mm longis superne multo glanduliferis, nervis loborum submarginalibus; thecae antherarum ca. 2 mm longae; appendices antherarum anguste ovatae ca. 0.6 mm longae et base 2.3 mm latae apice anguste rotundatae extus minute spiculiferae; nodi stylorum late disciformes margine paucе denticulati; scapi stylorum in partibus superioribus sparse hispidulis perbreves subnulli. Achaenia ca. 2 mm longa in costis breviter setifera inter costas dense glandulo-punctata et pustulifera, pustulis 1-4-cellularis; setae pappi ca. 35 plerumque 4.0-4.5 mm longae apice leniter latiores margine et extus dense scabridulæ; series exteriores setiformes 0.3-0.9 mm longae dense scabridulæ. Grana pollinis in diametro ca. 40 μ irregulariter areolata et spinulosa (Lychnophora-Type).

TYPE: BRASIL: Mato Grosso: 85 km from Cuiaba en route to Rondonopolis. Frequent in hilly cerrado. Woody shrub 2-3 m high, 3-5 cm diam, post-flowering. Sept. 28, 1963. B. Maguire, J. Murea Pires, C. K. Maguire & Nilo T. Silva 56893 (Holotype, UB; isotype, NY).

The inflorescence having no obvious bracts, the close-set secundly borne heads, and the pollen type all suggest the new species is closely related to *V. scorpioides* Pers.. but the blunt obovate leaves are thoroughly distinct. The involucre also differs, being more like that of *V. brasiliensis* and related species which have non-scorpoid more divaricately branched inflorescences.

VERNONIA PINHEIROI H. Robinson, sp. nov.

Plantae fruticosae ad 2 m altae multo ramosae. Caules teretes vel leniter angulati canescensciter perdense hispiduli, pilis sub-T-formibus irregulariter glebosis apice argute acutis. Folia alterna, petiolis ca. 5-10 mm longis; laminae ovatae plerumque 3.5-7.0 cm longae et 1.4-3.0 cm latae base breviter acuminatae margine integrae apice acutae vel vix acuminatae supra et subtus perdense canescensciter pubescentes et perdense glandulo-punctatae, nervis primariis ad medio sulcatis, nervis secundariis utrinque ca. 5-6 ca. 45° ascendentibus leniter arcuatibus. Inflorescentiae in ramis terminales paucē ramosae, ramis serialiter cymosis in nodis leniter deflectis perdense canescensciter hispidulis, bracteis foliiformibus plerumque 1.5-2.5 cm longis et 0.6-0.9 cm latis. Capitula in seriebus solitaria sessilia vel subsessilia axillares vel raro extra-axillares campanulata ca. 11-12 mm alta et ca. 7 mm lata; squamae involucri fuscescentes ca. 50 subimbriatae ca. 4-5-seriatae erecto-patentes linear-lanceolatae 2-10 mm longae et 0.5-1.5 mm latae apice longe pungentes margine inferne subscariosae et pallidiores extus in vittis medianis latis sparse puberulae et superne multo punctatae. Flores ca. 25 in capitulo. Corollae lavandulae ca. 9 mm longae extus plerumque sparse minute glanduliferae, tubis anguste infundibularibus ca. 5 mm longis, faucibus ca. 0.7 mm longis, lobis linear-lanceolatis ca. 3 mm longis et ca. 0.6 mm latis ad apicem paucē minute spiculiferis et dense glandulo-punctatis; thecae antherarum ca. 2.7 mm longae; appendices antherarum oblongo-ovatae ca. 0.4 mm longae et 0.23 mm latae apice rotundatae extus glabrae; nodi stylorum papillosi; scapi stylorum in partibus hispiduli superioribus ca. 0.7 mm longi. Achaenia ca. 2 mm longa dense longe sericeo-setifera et multo breviter glandulifera; setae pappi ca. 37 ca. 5 mm longae superne vix vel non latiores margine dense scabridulae extus subcomplanatae minute remote scabridulae, scabridis minute hyaline apiculatis, squamae extiores linear-lanceolatae ad 1.8 mm longae et ad 0.15 mm latae extus sparse minute scabridulae. Grana pollinis in diametro ca. 50-55 μ m valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. arenaria*-Type).

TYPE: BRASIL: Bahia: Serra do Açuá. São Inácio, on rocky hillside called Pedra da Mulher just south of town. Alt. ca. 500-600 m. ? Metamorphosed sandstone. Approx. 42°44'W, 11°07'S. This plant on summit of rocks. Shrub, much branched to 2 m. Leaves grey, paler beneath. Phyllaries pale green with pale straw setose tips. Corolla lilac. 25 Feb. 1977. R.M.Harley, S.J.Mayo, R.M.Storr, T.S.Santos & R.S.Pinheiro L9028 (Holotype, CEPEC; isotype US).

The new species is very close to *V. arenaria* Mart., described from the State of Piauhy immediately to the north of Bahia. On the basis of the plate of *V. arenaria* in Baker (1873) and an isotype of its synonym, *V. sarmientiana* Gardn., the latter species has blunter leaf-tips, more subtruncate leaf bases, and much

shorter abruptly acuminate involucral bracts. The involucral bracts of the new species exceed the length of the florets at anthesis, while the bracts of *V. arenaria* are obviously exceeded by the florets. On the basis of the Gardner type, the two species share the lumpy, often sub-T-form hairs of the stems and leaves and the median furrow on the undersurface of the midvein of the leaf.

VERNONIA PSEUDOPIPTOCARPHA H. Robinson, sp. nov.

Plantae fruticosae ca. 2 m altae. Caules brunnescentes subhexagonales et subtiliter striati minute puberuli vel subtomentelli et sparse minute glanduliferi. Folia alterna breviter petiolata, petiolis ad 10 mm longis; laminae oblongo-ovatae vel ovato-ellipticae ad 13 cm longae et 7 cm latae base breviter acutae interdum inaequales margine integrae vel minute mucronato-denticulatae anguste indistincte reflexae apice acutae vel breviter acuminatae supra dense breviter pilosae subscabridae subtus plerumque in nervis et nervulis puberulae, nervis et nervulis majoribus prominentibus, nervis secundariis utrinque ca. 9 recte patentibus vel leniter ascendentibus. Inflorescentiae multo ramosae, ramis serialiter cymosis interdum subtiliter in nodis deflectis subtomentellis et sparse minute glanduliferis; bracteis foliiformibus breviter petiolatis in laminis ovatis 2.0-6.5 cm longis et ca. 1-3 cm latis apice plerumque breviter acutis. Capitula in seriebus solitaria vel geminata sessilia anguste campanulata vel subcylindrica ca. 9-10 mm alta et 5 mm lata; squamae involucri fulvescentes ca. 35 subimbricatae 5-6-seriatae plerumque appressae 1.5-6.0 mm longae ad 1.8 mm latae, exteriores ovatae breviter acutae margine anguste scariosae et dense minute fimbriatae extus inferne glabrescentes superne sparse appresse puberulae, interiores oblongo-lanceolatae vel lineares apice obtusae margine albo-fimbriatae superne extus dense minute glanduliferae et canescititer subtomentellae. Flores ca. 15 in capitulo. Corollae lavandulo-purpureae ca. 6 mm longae extus subglabrae in medio sparse minute glanduliferae, tubis cylindraceis 3-4 mm longis, faucibus 0.5-1.0 mm longis, lobis linearilanceolatis 2.5 mm longis et 0.5 mm latis apice extus dense minute glanduliferis; thecae antherarum ca. 2.5 mm longae; appendices antherarum ovato-lanceolatae breviter acutae ca. 0.5 mm longae et 0.2 mm latae extus glabrae; scapi stylorum fere ad ramos glabri. Achaenia immatura ad 2 mm longa plerumque glabra base juxta carpopodia pauce breviter setifera; setae pappi interiores facile deciduae ca. 30 plerumque 5.0-5.5 mm longae plerumque anguste complanatae base sensim angustiores margine perdense scabridulae extus sparsius scabridulae apice subobtusae, squamae exteriores numerosae oblongae vel lanceolatae ad 1 mm longae et plerumque 0.10-0.25 mm latae. Grana pollinis in diametro ca. 45 μ m valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. argyro-*

phyllum-Type).

TYPE: BRASIL: Goiás: Chapada dos Veadeiros, ca. 10 km south of Cavalcante. Elev. 1000 m. Gallery margin. Gallery and adjacent cerrado. Shrub ca. 2 m tall. Heads dull lavender-purple. 8 March 1969. H.S.Irwin, R.Reis dos Santos, R.Souza & S.F.da Fonseca 24081 (Holotype, US).

The new species has a habit reminiscent of members of the genus *Piptocarpha*, with usually two heads clustered in the axils of short-petiolate, leaflike bracts. The details of the florets are, nevertheless, entirely *Vernonia*. The *V. argyrophylla*-Type pollen indicates that the new species is not even closely related to *Piptocarpha* or to various species of *Vernonia* mostly from the Andean Region which resemble *Piptocarpha*.

VERNONIA REGIS H. Robinson, sp. nov.

Plantae fruticosae 1.0-1.5 m altae laxe ramosae. Caules brunnescentes teretes striati superne dense sericei. Folia alterna breviter petiolata, petiolis 2-4 mm longis; laminae late ellipticae vel oblongae plerumque 2.0-4.5 cm longae et 1.5-3.2 cm latae base obtusae vel breviter acutae margine integrae apice obtusae vel rotundatae et minute mucronatae velutinae inferne sensim sublanatae subtus dense sericeae non glanduliferae, nervis secundariis pinnatis ascendentibus laxe arcuatis utrinque 3-4. Inflorescentiae multo ramosae, ramis scorpioideo-cymosis dense fulvo-sericeis vel breviter lanatis, bracteis distinctis subsessilibus ovatis vel ellipticis ad 15 mm longis et 8 mm latis apice breviter acutis subtus breviter lanatis. Capitula congesta plerumque in nodis solitaria ca. 13 mm alta et 4-5 mm lata; squamae involucri ca. 28 subimbricatae 4-5-seriatae non patentes ovatae vel lanceolatae 1-8 mm longae et 1-2 mm latae apice acutae vel breviter mucronatae, exteriore plerumque in medio virides margine dense longe fimbriatae extus dense sericeae, interiores superne purpurascentes sparse vel evanescentiter sericeae. Flores ca. 10 in capitulo. Corollae purpureae in textura tenues 8-9 mm longae in tubis faucibus et apicibus loborum minute glanduliferae, tubis cylindraceis ca. 2.5 mm longis et 1 mm latis, faucibus superne vix latioribus ca. 1.3 mm longis, lobis linearibus ca. 3.5 mm longis et ca. 0.5 mm latis extus superne breviter indurate spiniformibus; thecae antherarum ca. 2.7 mm longae; appendices antherarum ovatae ca. 0.5 mm longae et 0.25 mm latae apice breviter acutae extus glabrae; scapi stylorum in partibus hispidulis superioribus ca. 0.5 mm longi. Achaenia ca. 2 mm longa dense sericeo-setifera; setae pappi interiores sub-deciduae ca. 37 plerumque 7.5-8.5 mm longae superne vix latiores sub-complanatae margine perdense scabridulae extus sparsius scabridulae, squamae exteriore lanceolatae ca. 2.5 mm longae et ca. 0.4 mm latae in marginem distincte imbricatae apice anguste acutae extus minute sparse scabridulae. Grana pollinis in diametro ca. 50 um valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation near *V. argyrophylla*-Type

with extra cross-walls in colpar area above and below pores.

TYPE: BRASIL: Bahia: Município de Mucugê, a 3 km ao S de Mucugê. Na estrada que vai par Jussiape. Elev. ca. 1000 meters. Shrub 1-1½ meters tall, flowers purple. July 26, 1979. R.M.King, S.Mori, T.S.dos Santos & J.Hage 8158 (Holotype, RB; isotypes CEPEC, US).

The new species seems most closely related to species such as *V. tragiaeifolia* DC. and *V. megapotomica* Spreng. of Section *Stenoccephalium*, having reduced numbers of involucral bracts and flowers in the heads. *Vermonia regis* has a particularly colorful inflorescence with purplish corollas and bracts and with a greenish median band on the outer involucral bracts.

The species is named for Robert M. King who has been responsible for the collection of a number of species described in this paper.

VERNONIA SANTOSII H. Robinson, sp. nov.

Plantae herbaceae perennes ad 4.5 dm altae vegetative acaulescentes. Radices palares subtuberose. Folia rosulata sessilia; laminae in sicco coriaceae subcarnosae? obovatae plerumque 4-7 cm longae et 1.5-2.2 cm latae base cuneatae margine integrae distinete incrassate limbatae apice rotundatae vel breviter obtusae supra et subtus sparse evanescentiter villosae subtus plerumque in nervis primariis persistentiter sub-lanatae, nervis secundariis obscuris utrinque ca. 4 valde ascendentibus. Inflorescentiae erectae longe scaposae superne non vel uni-ramosae, scapis dense villosis vel sub-lanatis non vel paue remote bracteiferis, capitulis solitariis vel in cymis positis sessilibus vel variabiliter peduncatis. Capitula late campanulata 13-17 mm alta et 15-25 mm lata; squamae involuci in partibus superioribus purpureo-tinctae ca. 55 subimbricatae 4-5-seriatae appressae oblongae vel linear-lanceolatae 2-14 mm longae et inferne 1.5 vel 2.5 mm latae extus dense villosae margine inferne anguste scariosae albae apice in squamis exterioribus breviter apiculatae in squamis interioribus lineariter acuminatae. Flores ca. 50 in capitulo exterioribus praecoces. Corollae lavandulae in textura subtenues 10-11 mm longae, tubis anguste infundibularibus 5-6 mm longis, faucibus ca. 1 mm longis, tubis et faucibus extus sparse minute glanduliferis, lobis linearibus 4-5 mm longis et ca. 0.6 mm latis subapice dense glandulo-punctatæ ceterum extus glabris; thecae antherarum ca. 4 mm longae base in partibus breviter caudatae; appendices antherarum ovatae ca. 0.5 mm longae et 0.28 mm latae apice obtusae extus glabrae; scapi stylorum in partibus hispidulis superioribus ca. 1.5 mm longi. Achaenia ca. 2.5 mm longa perdense longe setifera; setae pappi persistentes ca. 35 plerumque 8.5-9.0 mm longae apice vix vel non lateriores margine et extus dense scabridulae, squamae exteriores linear-lanceolatae 2.5-3.0 mm longae et ad 0.25 mm latae apice anguste acutae margine perdense scabridulae extus sparse spiculiferae. Grana pollinis in diametro 50-55 um valde lophorata, cristis altis

minute multo spinuliferis, spinis majoribus nullis (reticulation near *V. argyrophylla*-Type with additional cross-walls in colpar area above and below pores).

TYPE: BRASIL: Bahia: Município de Rio de Contas. Base de Pico das Almas, a 18 km ao NW de Rio de Contas. Elev. ca. 1300 meters. Ray flowers lavender, disc flower yellow-brown. July 24, 1979. R.M.King, S.Mori, T.S.dos Santos & J.Hage 8117 (Holotype, RB; isotypes CEPEC, US). PARATYPE: BRASIL: Bahia: Município de Rio de Contas, a 4 km ao NW de Rio de Contas. Campo rupestre. Elev. 1000 meters. Ray flowers lavender, disc flowers yellow. July 21, 1979. King et al. 8064 (CEPEC, US).

The new species is distinguished from most members of *Vernonia* by the acaulescent or short-caulescent habit. Other such species from Brasil include *V. belliodoides* Ekman, *V. cephalotis* DC., *V. hypochaeris* DC., *V. hypochlora* Malme and *V. sellowii* Less., but only the last from southern Brasil, shows a tendency toward a similar seriatel cymose inflorescence. None of the other species shows the same type of entire, distinctly rimmed leaf margin seen in the new species, and there is no reason to believe that the various acaulescent species are necessarily closely related either to *V. santosii*, or to each other. At least one, *V. hypochlora*, seems more closely related to *V. cognata* Less. and *V. herbacea* (Vell.) Rusby.

The field notes on both collections indicate a head with lavender ray flowers and yellowish disk flowers. Closer examination shows that the outer series of flowers is formed of normally shaped but precociously developed outer discoid corollas. The distinctive feature is the manner in which the inner disk flowers, as a well-defined group, remain in bud and buried in the yellowish pappus until after the outer corollas have fallen. One head has been seen showing the later stage where the inner group of flowers is in bloom.

VERNONIA SODERSTROMII H. Robinson, sp. nov.

Plantae suffruticosae; rhizomata horizontalia brevia. Caules primarii erecti interdum aggregati in partibus inferioribus non ramosi 30-50 cm alti apice multo ramosi atro-rubrescentes subhexagonales evanescititer dense sordido-tomentosi, ramis perdense fulvo-tomentosis. Folia alterna subsessilia in caulis primariis mox decidua non visa, petiolis ad 1 mm longis; laminae oblongae plerumque 10-20 mm longae et 5-7 mm latae base obtusae vel rotundatae margine integrae vel subintegrae apice rotundatae supra tenuiter pallide sericeo-velutinae subtus dense fulvo-tomentosae, nervis secundariis utrinque ca. 3 plerumque 40°-50° ascendentibus vix arcuatibus. Inflorescentiae multo ramosae, ramis serialiter cymosis subtiliter deflectis dense sordide tomentosis, bracteis foliiformibus subsessilibus plerumque 10-15 mm longis et 5-6 mm latis. Capitula in seriebus solitaria sessilia axillaris vel extra-axillaris campanulata ca. 10 mm alta et 7-8 mm lata; squamae involucri ca. 37 subimbricatae ca. 4-seriatae

plerumque appressae 3-7 mm longae et 0.8-1.5 mm latae apice argute acutae margine inferne anguste scariosae et dense fimbriatae extus inferne sericeae superiore margine et extus dense sordido-villosae. Flores ca. 19 in capitulo. Corollae lavandulae vel pallidiore, tubis anguste unfundibularibus ca. 5 mm longis plerumque glabris superne sparse setiferis, setis in cellulis biseriatis, faucibus ca. 0.5 mm longis extus glabris, lobis linear-lanceolatis ca. 4 mm longis et 0.5 mm latis apice dense spiculiferis minute papillosis extus ceterum glabris, spiculis brevibus argutis in cellulis uniseriatis; thecae antherarum ca. 2.5 mm longae; appendices antherarum anguste oblongae breviter acutae extus glabrae; scapi stylorum in partibus hispidulis superioribus ca. 1 mm longi. Achaenia immatura ad 1.5 mm longa dense longe setifera; setae pappi persistentes interiores ca. 40 plerumque ca. 6 mm longae apice leniter latiores margine perdense scabridulae extus sparsius scabridulae, setae exteriores anguste lineares 1.5-2.0 mm longae apice spiniformes margine dense scabridulae extus planae et laeves. Grana pollinis in diametro 50-55 μm valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. argyrophylla*-Type).

TYPE: BRASIL: Goiás: Serra do Caiapó, ca. 50 km S of Caiapónia on road to Jataí. Rock summit of mesa, near escarpment, $17^{\circ}12'S$, $51^{\circ}47'W$. Elev. 800-1000 m. Subshrub ca. 75 cm tall. Heads magenta. $n = \text{ca. } 16$, det by B.L.Turner. Oct. 25, 1964. H.S. Irwin & T.R.Soderstrom 7334 (Holotype, US). PARATYPE: BRASIL: Goiás: Serra do Caiapó, ca. 48 km S of Caiapónia on road to Jataí, among campo grasses at summit of cliff. $17^{\circ}12'S$, $51^{\circ}47'W$. Elev. 800-1000 m. Heads in bud. Oct. 23, 1964. H.S.Irwin & T.R.Soderstrom 7262 (US).

The two collections of the new species both show the distinctive erect leafless primary stems ending above abruptly in a densely branching leafy crown. The species may be close to the series discussed below with *V. souzae*, but the involucral bracts of *V. soderstromii* present a different appearance from any of them, having a thinner, more evenly distributed, less erect pubescence and being more obviously lanceolate in shape.

VERNONIA SOUZAE H. Robinson, sp. nov.

Plantae suffruticosae erectae ca. 1 m altae mediocriter ramosae. Caules teretes vel subhexagonales dense brunnescentiter velutini. Folia alterna, petiolis 1-8 mm longis dense velutinis; laminae oblongae vel oblanceolatae plerumque 2-11 cm longae et 0.8-3.0 cm latae base obtusae vel breviter acutae margine remote subserrulatae apice rotundatae supra dense sordido-velutinae subtus dense flavo-tomentosae, nervis secundariis patentibus ascendenter arcuatis. Inflorescentiae mediocriter ramosae, ramis serialiter cymosis in nodis vix deflectis dense sordide velutinis, bracteis foliiformibus plerumque 1.5-4.0 cm longis et 0.8-2.0 cm latis. Capitula in seriebus solitaria vel raro geminata sessilia axillares vel raro extra-axillares ca. 11-13 mm alta

et 8-10 mm lata; squamae involucri ca. 40 subimbricatae 4-5-seriatae plerumque appressae vel in apicem leniter patentes ovatae vel lanceolatae 2-10 mm longae et 1.5-2.0 mm latae apice argute acutae sed extus et margine in pubescencia dense velutina et sordida occultae. Flores ca. 20 in capitulo. Corollae lavandulae in textura tenues 10-11 mm longae in tubis et faucibus extus glabrae, tubis anguste infundibularibus 6.0-6.5 mm longis, faucibus ca. 0.8 mm longis, lobis linear-lanceolatis ca. 4 mm longis et ca. 0.6 mm latis inferne extus glabris subapice spiculiferis interdum breviter glanduliferis et paucis longe setiferis, setis in cellulis uniseriatis, cellulis apicalibus setarum ad 0.7 mm longis; thecae antherarum ca. 3 mm longae; appendices antherarum ovatae 0.5-0.6 mm longae et ca. 0.23 mm latae apice breviter acutae extus glabrae; scapi stylorum in partibus hispidulis superioribus ca. 1.5 mm longi. Achaenia ca. 1.5 mm longa dense longe setifera; setae pappi persistentes 25-30 plerumque 6.0-6.5 mm longae apice leniter latiores margine dense scabridulae extus sparse scabridulae, squamae extiores anguste lineares ca. 1.5 mm longae apice anguste acutae margine scabridae extus sparse scabridae. Grana pollinis leniter oblata ca. 50 μm alta et 55 μm lata valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. argyrophylla*-Type).

TYPE: BRASIL: Goiás: Chapada dos Veadeiros, ca. 25 km N of Alto do Paraíso, ca. 1250 m elev. Cerrado. Campo and cerrado on outcrops. Herb to ca. 1 m tall. Heads lilac. 22 March 1971. H.S.Irwin, R.M.Harley & G.L.Smith 32990 (Holotype, UB; isotype, US). PARATYPE: BRASIL: Goiás: Chapada dos Veadeiros, 14°S, 47°W, ca. 20 km W of Veadeiros. Elev. 1000 m. Creek margin, among rocks. Subshrub ca. 1 m tall. Heads magenta. 9 Feb. 1966. H.S.Irwin, J.W.Grear,Jr., R.Souza & R.Reis dos Santos 12441 (US).

In the densely pubescent involucle, *V. souzae* seems most similar to such species as *V. floccosa* Gardn., *V. lacunosa* Mart. and *V. vestita* Baker. The new species is initially distinguishable from all of these by the oblong to oblanceolate leaves with rounded tips. The latter two species differ further by having a rugulose upper leaf surface and having only 8-10 flowers by head. The totally glabrescent upper leaf surfaces, the large ovate lower leaves, the smaller upper inflorescence bracts, and the more densely branched rather thyrsoid inflorescence easily distinguish *V. floccosa*.

The new species has the upper surfaces of the leaves mostly covered with a dense felt, but one older leaf shows a glabrescent condition, and the veinlets of the upper surface can be seen to be prominent. The long setae on the tips of the corolla lobes consist mostly of a single moderately thick-walled apical cell.

VERNONIA SUBCARDUOIDES H. Robinson, sp. nov.

Plantae herbaceae perennes erectae ad 50 cm altae supra basem non ramosae. Caules rubescentes teretes leniter striati superne sparse villosi. Folia alterna subsessilia, petiolis ca.

1-2 mm longis; laminae herbaceae anguste oblongae vel oblongo-lanceolatae plerumque 3.5-8.0 cm longae et 0.7-1.1 cm latae base acutae margine integrae anguste indistincte recurvatae apice acutae supra lucidae persparse tenuiter pilosae subtus plerumque glabrae dense glandulo-punctatae, nervis et nervulis utrinque prominulis, nervis primariis subtus sparse tenuiter pilosis, nervis secundariis paucis utrinque ca. 4-5 brevibus erecto-patentibus. Inflorescentiae terminales non ramosae serialiter cymosae paucae capitatae, internodis dense villosis vel hirsutis, bracteis foliiformibus lanceolatis 2.5-3.5 cm longis et 0.6-0.9 cm latis, capitulis ex axillis bractearum long pedunculatis, pedunculis 1-3 cm longis dense villosis vel hirsutis. Capitula late campanulata 15-17 mm alta et 10-14 mm lata; squamae involucri coriaceae ca. 110 subimbricatae 5-6-seriatae inferiores patentes lanceolatae vel linearis-lanceolatae 4-14 mm longae et 1.0-1.5 mm latae apice minute apiculatae margine dense denticulatae superne margine et extus sublepidotae vel dense pilosae. Flores ca. 20? in capitulo. Corollae lavandulae in textura subtenuis ca. 12-13 mm longae, tubis anguste infundibularibus ca. 6.5 mm longis extus glabris, faucibus ca. 2 mm longis glabris, lobis anguste oblongis 3.5-4.0 mm longis et ca. 0.7 mm latis inferne glabris subapice dense glanduliferis; thecae antherarum ca. 4 mm longae; appendices antherarum oblongo-ovatae ca. 0.35 mm longae et 0.2 mm latae apice anguste rotundatae extus glabrae; nodi stylorum indistincti vel nulli; scapi stylorum in partibus hispidulis superioribus ca. 1.2 mm longi. Achaenia ca. 1.8-2.0 mm longa perdense setifera; setae pappi sordidae ca. 28 plerumque 8.5-9.0 mm longae apice non latiores interdum distinctae tenuiores margine et extus argute scabridulae, series exteriores setiformes ca. 1 mm longae indistincte scabridae. Grana pollinis distincte oblata ca. 50 μm alta et 65 μm lata valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (*reticulation V. argyrophylla*-Type).

TYPE: BRASIL: Minas Gerais: Serra do Espinhaço, ca. 3 km N of São João da Chapada. Elev. 1200 m. Cerrado. Campo, cerrado on outcrops, and wooded valley. Herb to ca. 50 cm tall. Heads lilac. 24 March 1970. H.S.Irwin, S.F.da Fonseca, R.Souza, R. Reis dos Santos & J.Ramos 28237 (Holotype, UB).

The flattened, lanceolate, denticulate involucral bracts of the new species are most like those of *V. carduoides* Baker, but they are much more coriaceous with scarcely thinner margins. Also, the margins are straight with rather regularly disposed teeth, while the margins are thinner and minutely laciniate in *V. carduoides*. The leaves of the new species are also broader, flatter, and more glabrous, with large dark glandular punctations on the under surface. The younger involucres of the new species retain a thin web of hairs distally, with some hairs present on the older bracts, but the involucre of *V. carduoides* shows few or no hairs at anthesis. The longer peduncles of the heads of the new species are also distinctive.

VERNONIA TOMBADORENSIS H. Robinson, sp. nov.

Plantae fruticosae ca. 1.5 mm altæ mediocriter ramosæ. Caules pentagonales inferne teretes striati canescentiter appresse breviter pubescentes, pilis sub-T-formibus sessilibus apice acutis. Folia alterna sessilia; laminae lineares plerumque 3-7 cm longæ et 0.2-0.4 cm latae base vix petioliformes margine integrae apice anguste obtusæ supra et subtus canescentiter appresse pubescentes et dense glandulo-punctatae, nervis secundariis brevibus valde ascendentibus. Inflorescentiae terminales mediocriter ramosæ, ramis serialiter cymosis in nodis vix vel non deflectis dense appresse puberulis, bracteis foliiformibus plerumque 2.5-3.5 cm longis et ca. 2 mm latis. Capitula in seriebus solitaria sessilia vel subsessilia axillares vel parum extra-axillares campanulata ca. 16 mm alta et 10 mm lata; squamae involucri ca. 60 subimbricatae ca. 6-seriatae appressae oblongæ vel anguste oblongæ 0.7-9.0 mm longæ et 0.5-1.5 mm latae apice plerumque subtruncatae et abrupte apiculatae margine anguste scariosæ saepe rubro-tinctæ extus villosæ et obscure glandulo-punctatae ad medio plerumque late viridi-vittatae. Flores ca. 17 in capitulo. Corollæ lavandulæ 10-11 mm longæ, tubis anguste unfundibularibus ca. 6 mm longis extus glabris, fauclibus ca. 1.5 mm longis glabris, lobis anguste oblongis 3.0-3.5 mm longis et ca. 0.6-0.7 mm latis superne dense pilosis et glandulo-punctatis; thecae antherarum ca. 3.5 mm longæ; appendices antherarum oblongo-lanceolatae ca. 0.5 mm longæ et 0.3 mm latae apice anguste rotundatae extus glabrae; scapi stylorum in partibus hispidulæ superioribus ca. 0.5 mm longi. Achaenia ca. 2.5 mm longa dense sericeo-setifera et multo breviter glandulifera; setae pappi persistentes 40-45 plerumque 6.0-6.5 mm longæ apice leniter latiores margine ad apicem et extus perdense scabridulæ ceterum margine mediocriter scabridulæ extus sparsius scabridulæ, squamae exteriores lineares ad 2 mm longæ et ad 0.15 mm latae extus sparse scabridulæ. Grana pollinis in diametro ca. 55-60 μm valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. arenaria*-Type).

TYPE: BRASIL: Bahia: Serra do Tombador, ca. 22 km W of Morro do Chapéu, elev. ca. 1000 m. Caatinga scrub on sand with sand-stone outcrops. Shrub ca. 1.5 m tall. Heads pinkish lavender. 20 Feb. 1971. H.S. Irwin, R.M. Harley & G.L. Smith 32642 (Holotype, UB; isotype NY).

On the basis of the pollen and the pubescence with sub-T-formed hairs, the new species is related to *V. arenaria* Mart. of nearby Piauhy and *V. pinheiroi* n.sp., also of the Serra do Tombador. The narrowly linear leaves of *V. tombadorensis* readily distinguish the species from others of the group. The short-tipped involucral bracts are also distinctive.

Literature Cited

- Baker, J. B. 1873. Compositae. I. Vernoniacaceae. In Martius, *Flora Brasiliensis* 6 (2): 1-179, pl. 1-50.
- Jones, S. B. 1979. Synopsis and pollen morphology of *Vernonia* (Compositae: Vernonieae) in the New World. *Rhodora* 81 (828): 425-447.
- Keeley, S. C. and S. B. Jones 1977. Taxonomic implications of external pollen morphology to *Vernonia* (Compositae) in the West Indies. *Amer. Journ. Bot.* 64 (5): 576-584.
- Robinson, H. 1979. New species of Vernonieae (Asteraceae). II. Five new species of *Vernonia* from Bahia. *Phytologia* 44 (4): 287-299.
- Stix, E. 1960. Pollenmorphologische Untersuchungen an Compositen. *Grana palynol.* 2 (2): 41-114.

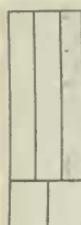


ASTERACEAE of BAHIA, BRAZIL

and B. Schlecht.

M. K. Krantz, J. C. M. S. de Oliveira,
R. G. E. Krantz, R. G. E. KrantzR. M. Krantz, A. M. A. M.
A. A. P.

Vernonia alvimii H. Robinson, Holotype, Jardim Botânico,
Rio de Janeiro. Photos by Victor E. Krantz, Staff Photographer,
National Museum of Natural History.



2563311

N. S. Irwin, R. Souza
Vernonia sp., Jataí 4 February
No. 17793 SERRA DAS CATAS

THE NEW YORK BOTANICAL GARDEN
Plants of the Planalto do Brasil
Estado de Goiás

No. 17793 SERRA DAS CATAS

Vernonia scabriuscula Pers.
Det. Dr. M. Barroso 1-6

Saboeiro ca. 1 m. tall. Heads white.
wet slope, ca. 10 km. N. of Salinópolis,
road to Jataí. Elevation 700 m.

H. S. Irwin, R. Souza
R. Reis dos Santos
26 June 1966
Plant was collected with the collaboration of the Universidade de Brasília,
the Agência Nacional de Águas, and the Ministério da Agricultura. Supported in
part by funds from the National Science Foundation.

Vernonia angulata H. Robinson, Holotype, United States
National Herbarium.



Vernonia caiapoensis H. Robinson, Holotype, United States National Herbarium.



Vernonia cristalinae H. Robinson, Holotype, Herbário
Universidade de Brasília.

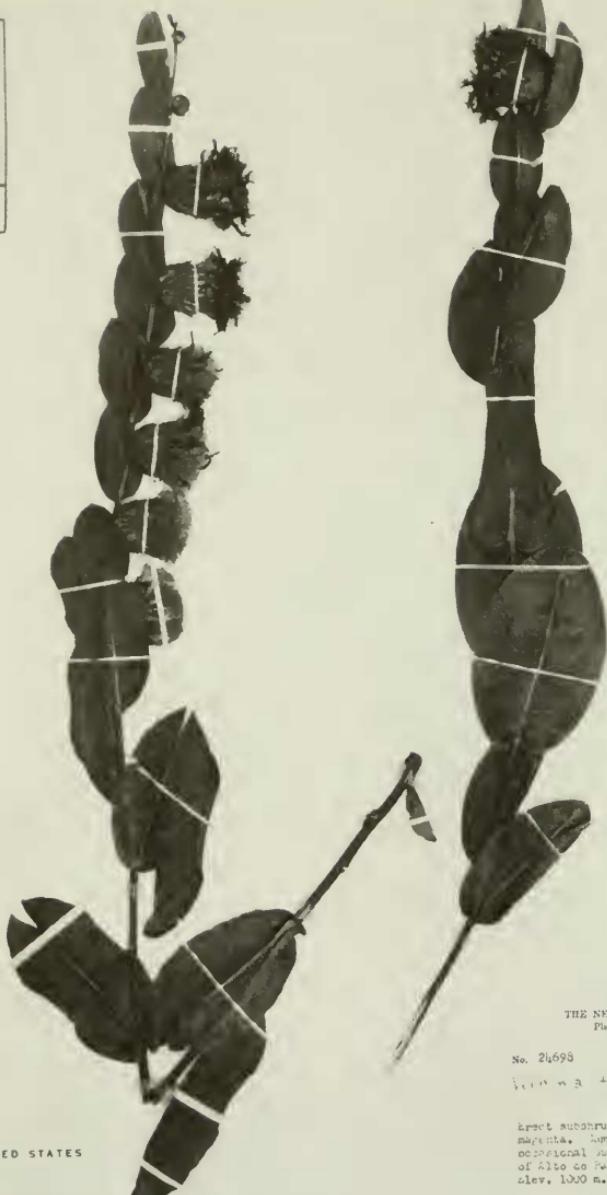


Fig. 1. *Vernonia echinocephala* H. Robinson, holotype, herbarium da UNB.

HOLOTYPE. Brazil. Minas Gerais: Vale das Ladeiras, gallery margin, secondary forest and edges of wet meadows, 1,500 m., 1 km. N. of Alto do Paraiso, May 1971, leg. H. Robinson (UNB).

Specimen No. M.H. 1. May 1971
from the National Science Foundation
Botany Department

Vernonia echinocephala H. Robinson, Holotype, Herbário
Universidade de Brasília.



UNITED STATES

2518523

NATIONAL HERBARIUM

Vernonia fonscuae H. Robinson, Holotype, United States
National Herbarium.

UB
MICH
N.V.
D.B.H.



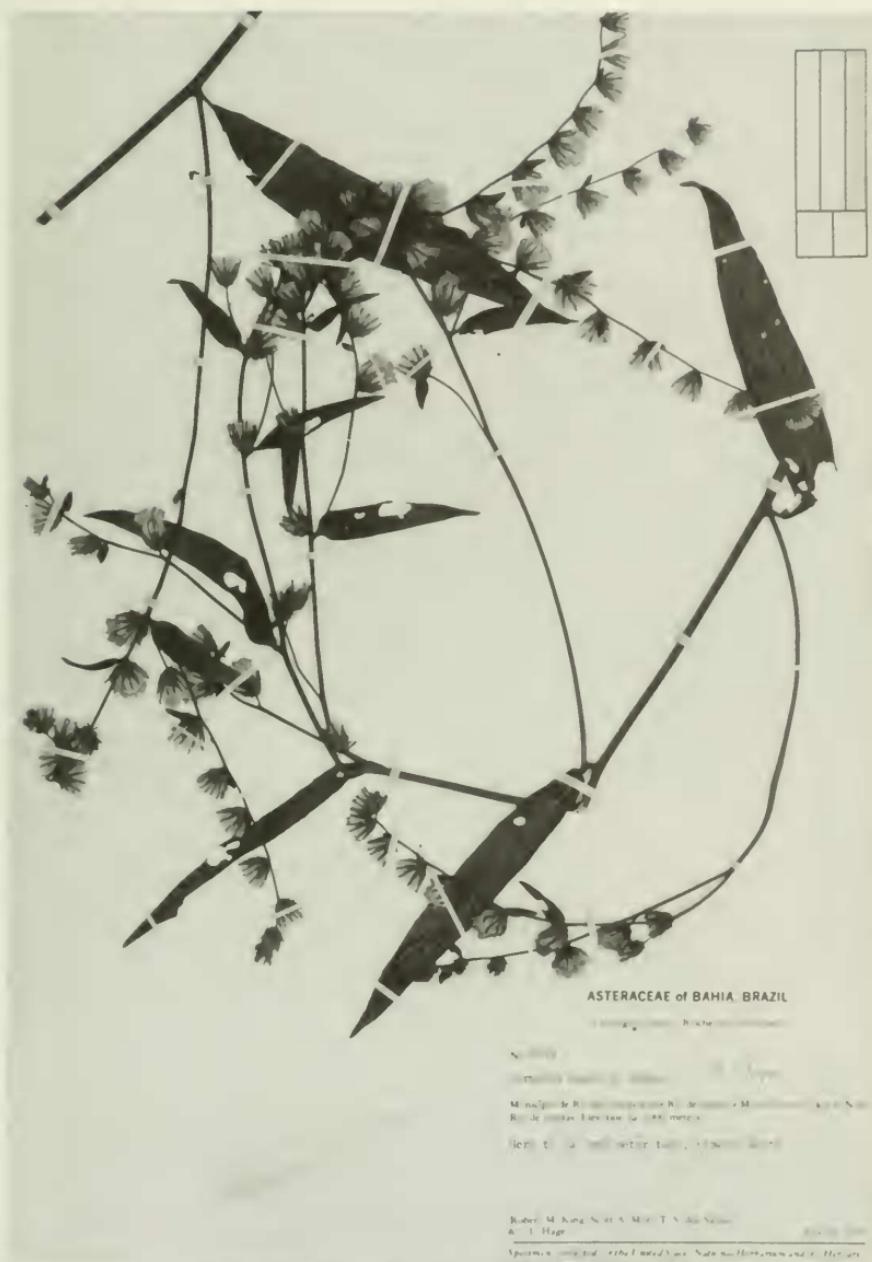
Top
No. 31
Raparia
S. Brazil

Setsub. "La tall".
Magdalena, Tercero, Araguaia.
WU ad a - t wet car -
Nam N. f Alto d. Kreis, -
10 m.

Vernonia greearii H. Robinson, Holotype, Herbário Universidade de Brasília.



Vernonia piresii H. Robinson, Holotype, Herbário Universidade de Brasília.



Vernonia hagei H. Robinson, Holotype, Jardim Botânico, Rio de Janeiro.



R. H. ROBINSON
BRAZIL AND BAHIA
S. A.

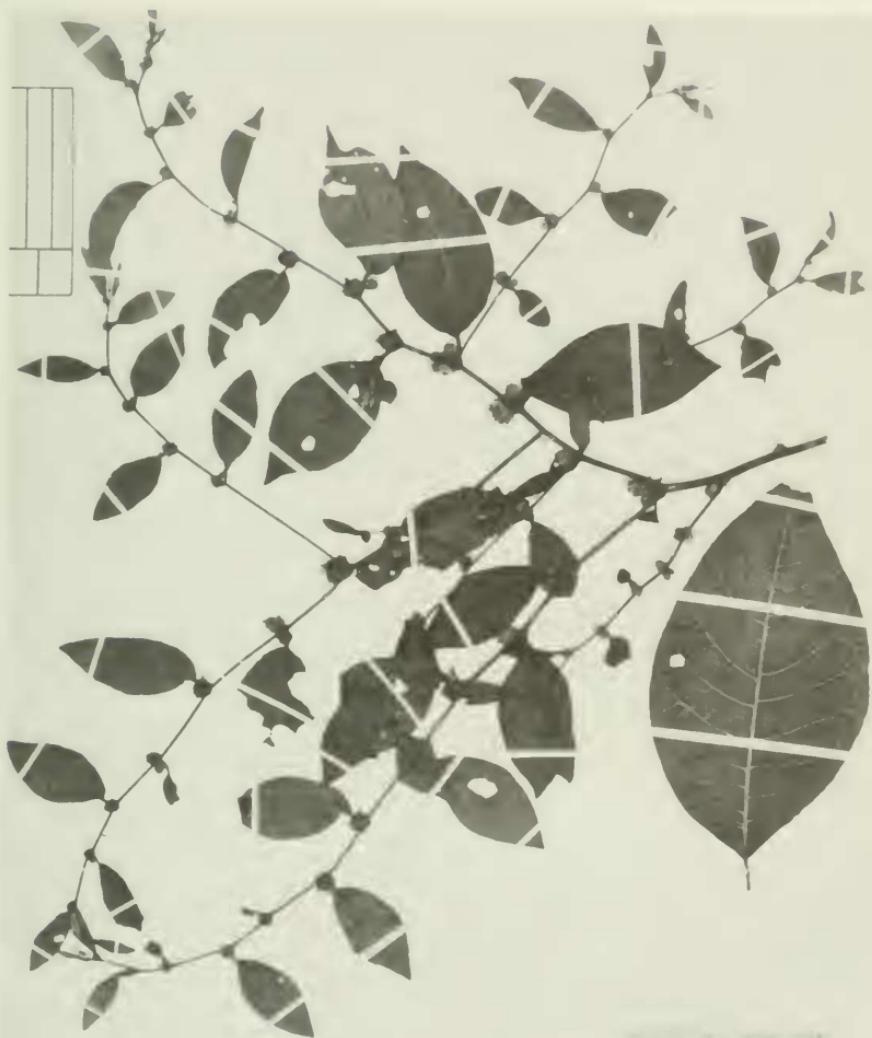
285164

R. H. ROBINSON AND R. S. PINHEIRO
in Herbarium

NATIONAL HERBARIUM

Field work sponsored by the Royal Botanic Gardens, Kew, and the Academic
Brazilian de Ciências Agrárias, and a contribution of the Brazilian
Academy of Sciences. Type specimen. Bahia, January 1939.

Vernonia pinheiroi H. Robinson, Isotype, United States
National Herbarium.



UNITED STATES

28|87|8

NATIONAL HERBARIUM

Vernonia pseudopiptocarpa H. Robinson, Holotype, United States National Herbarium.



ASTERACEAE OF BAHIA, BRAZIL

Metric Scale: M. m. M. cm. M. mm. and inches
Equisetum: 10 mm. 10 cm. 10 m.

Scale: 10 mm. 10 cm. 10 m.

Equisetum: 10 mm. 10 cm. 10 m.

Vernonia regis H. Robinson, Holotype, Jardim Botânico, Rio de Janeiro.



ASTERACEAE of BAHIA BRAZIL

Vernonia santosii H. Robinson, Holotype, Jardim Botânico,
Rio de Janeiro.



UNITED STATES

2515677

NATIONAL HERBARIUM

Vernonia soderstromii H. Robinson, Holotype, United States
National Herbarium.



Vernonia souzae H. Robinson, Holotype, Herbário Universidade de Brasília.



THE NEW YORK BOTANICAL GARDEN

Plants of the Planalto do Brasil
Brade de Minas Gerais
Barro de Matinhais

No. 20237

• • 3

herb to ca. 1m tall, heads 1 in. ~~lvs~~. ^{lvs} serratus,
Junc., cerrado or outcrop, and w. ~~valley~~
valley, ca. 1km N. of Rio João da ~~heads~~
elev. 1200m.

H. S. Irwin, S. F. de Figueiredo,
M. L. Lima, R. Reis dos Santos,
J. Ramey

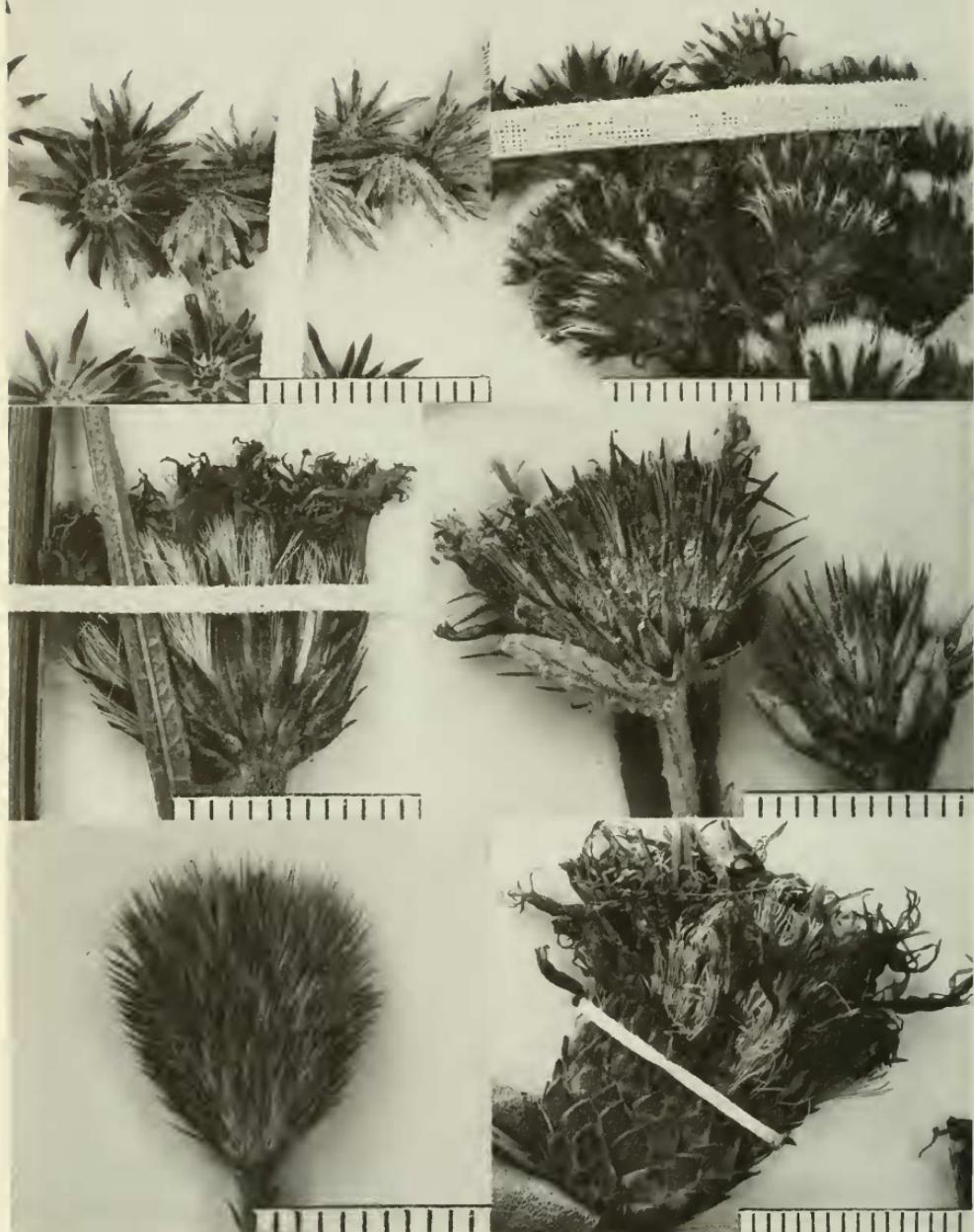
Specimen loaned with the collaboration of the Universidade de Brasília and
the Instituto de Pesquisas e Extensão, Faculdade de Ciências Exatas
of the University of Brasília, Brazil.



Vernonia subcarduoides H. Robinson, Holotype, Herbário
Universidade de Brasília.



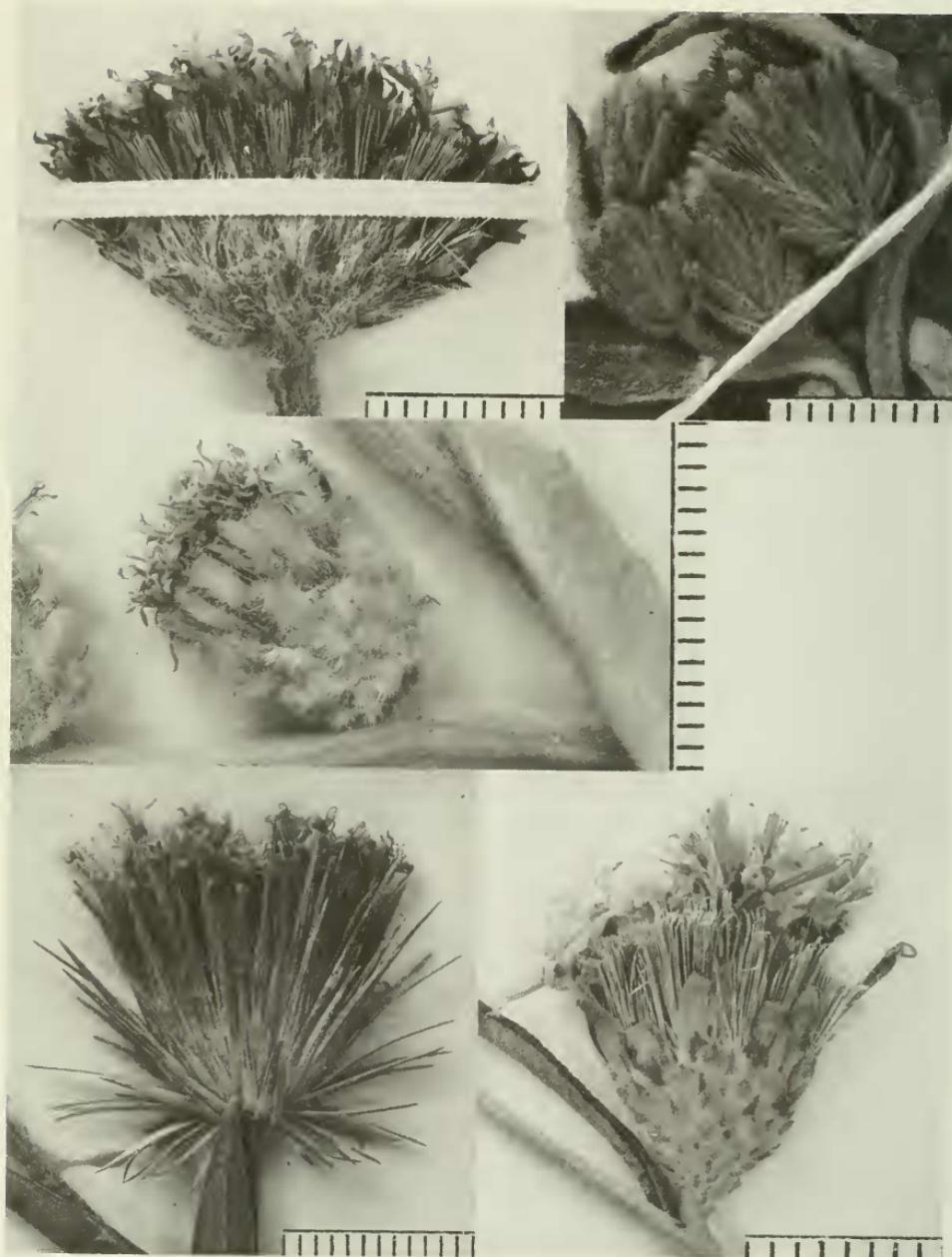
Vernonia tombadorensis H. Robinson, Holotype, Herbário
Universidade de Brasília.



Enlargements of heads of *Vernonia*. Top. *V. alvimii*, *V. angulata*. Middle. *V. caiapoensis*, *V. cristalinae*. Bottom. *V. echinocephala*, *V. fonseciae*.



Enlargements of heads of *Vernonia*. Top. *V. greearii*, *V. hagei*. Middle. *V. pinheiroi*, *V. piresii*. Bottom. *V. pseudopiptocarpha*, *V. regis*.



Enlargements of heads of *Vernonia*. Top. *V. santosii*, *V. soderstromii*. Middle. *V. souzae*. Bottom. *V. subcarduoides*, *V. tombadorensis* (from Isotype, NY).